(12) UK Patent Application (19) GB (11) 2 002 699 A

(21) Application No: 7829942
(22) Date of filing:
14 JUL 1978
(23) Claims filed:
14 JUL 1978
(30) Priority data:
(31) 2734586
(32) 1 AUG 1977
(33) FED. REP. OF GERMANY (DE)
(43) Application published:
28 FEB 1979
(51) INT. CL.²: B60C 9/18
(52) Domestic classification:
B7C 3B7 3B9
(56) Documents cited:
GB 1496517
GB 1327195
GB 1303955
GB 1215820
(58) Field of search:
B7C
(71) Applicants:
CONTINENTAL GUMMI-WERKE AKTIENGESELLSCHAFT
CONTINENTAL-HAUS/POSTFACH 169,
3000 HANNOVER,
FEDERAL REPUBLIC OF GERMANY
(72) Inventors:
JULIUS PETER
GERHARD MAUK
DIETER KUHN
HEINRICH HUININK
(74) Agents:
POTTS, KERR & CO.

(54) A TREAD REINFORCING BELT IN A PNEUMATIC TYRE

(57) A tension-resistant belt 6 extending substantially over the width of the tread strip region 5 and being located between the radial carcase 1 and the tread strip region, comprises at least two superposed parallel cord fabric plies 7, 8 forming a cross-bracing and a ply 11 (band) located thereabove, the filaments of ply 11 subtending very small angles e.g. 0—5° with the circumferential direction. In order to vary the influence of the ply 11 on the plies 7, 8 over the belt width, a rubber panel 10 is located between the plies 8 and 11, so that, seen in the transverse direction of the belt, the filaments of the band, in places, are more closely located to the plies of the cross-bracing than in the remaining region(s) of the belt. The panel preferably has a Shore A hardness of 45—70 and a thickness of 0.7 to 2.5 times that of plies 7 and 8. The filaments are preferably of material e.g. polyamide or polyester which shrinks during vulcanization. In section the panel may form a single hump, as shown, or a plurality of humps (Fig. 4 not shown).

=DE 2734586

=FR 2399330

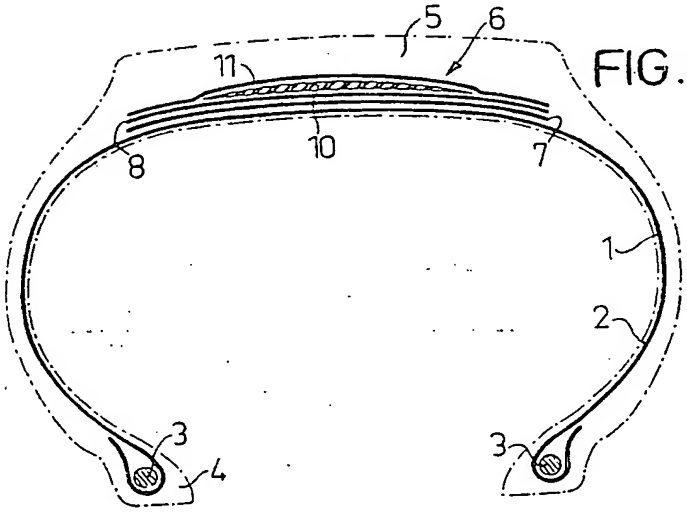

FIG. 1

GB 2 002 699 A

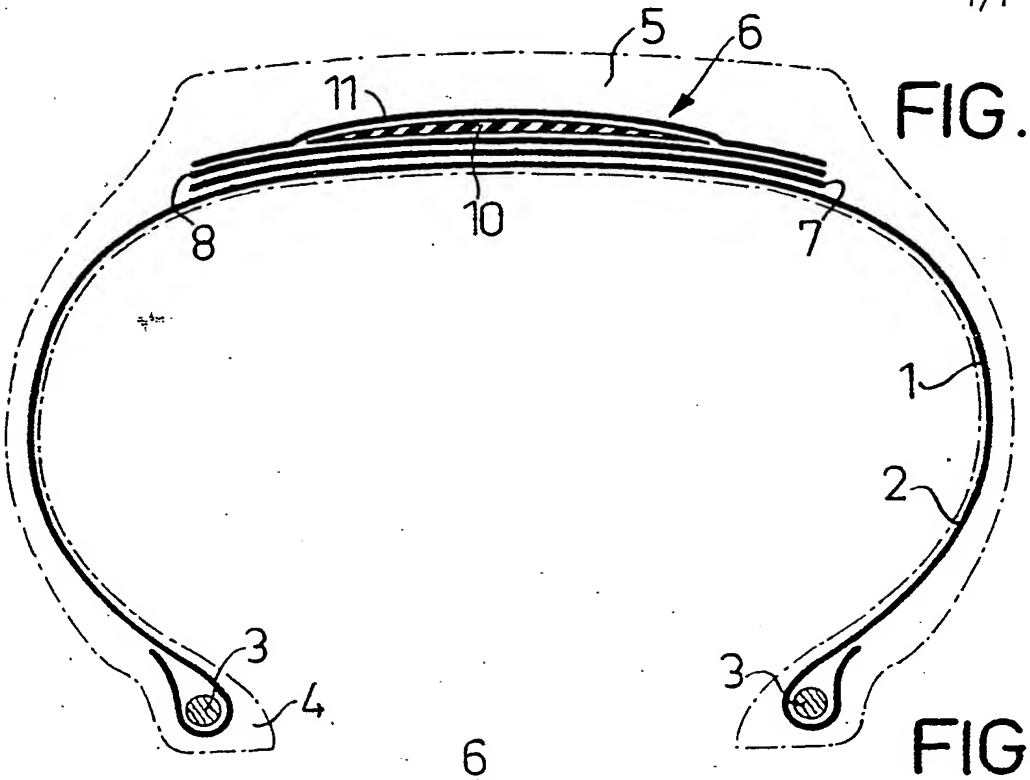

FIG.1

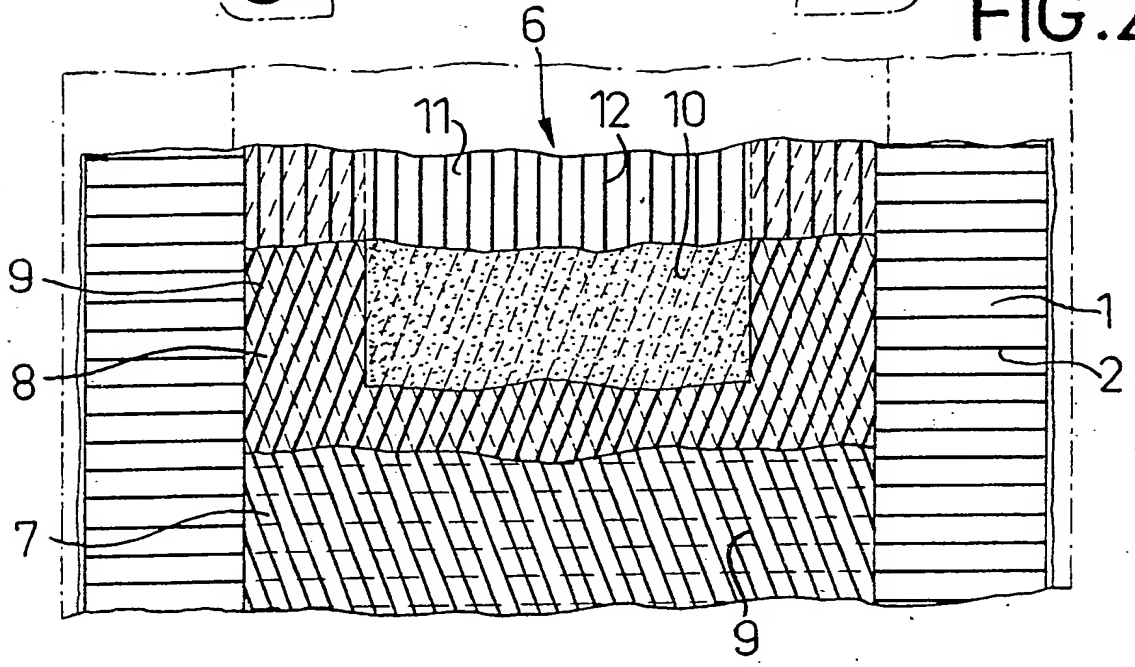

FIG.2

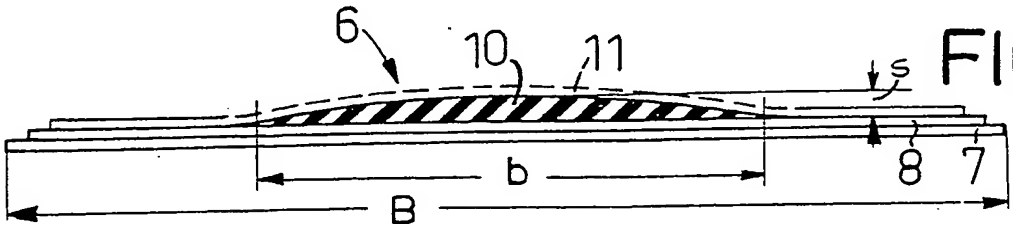

FIG.3

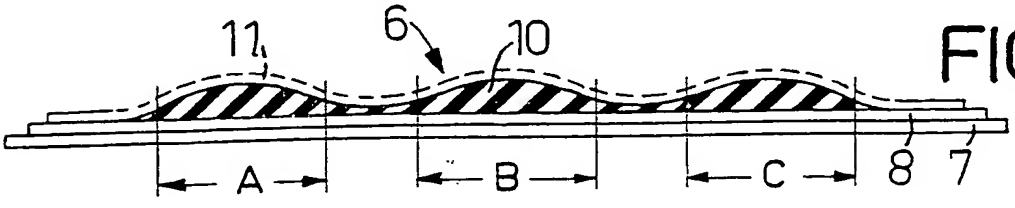

FIG.4

SPECIFICATION

PNEUMATIC VEHICLE TYRE

The present invention relates to a pneumatic vehicle tyre, more especially a pneumatic tyre having a radial carcase with a tension resistant belt extending substantially over the width of the tread strip region and being located between said carcase and said tread strip region, whereby the belt consists of at least two superposed cord fabric plies preferably forming a symmetrical cross bracing, more especially of steel wires, and a ply (band) located thereabove made of mutually tension-resistant filaments or the like, more especially of a heat-shrinking material, which filaments subtend small angles with the circumferential direction of the tyre, more especially angles of from 0 to 5°.

In known tyres of this type, the aforesaid band extends over the whole width of the belt and thus in such a manner that the filaments forming the tyre are equidistantly located from the reinforcing members of the adjacent ply of the cross bracing. The position of the band and the remaining plies of the belt, hence extend parallel to one another, so that the effects of a triangular cross bracing result over the whole width of the belt, whereby the filaments or the like of the band lock the cross bracing and thus prevent the reinforcing members of such bracing from executing scissor-like movements.

The invention is based on the knowledge that it is often desirable to use the influence of the band without having to abandon a continuous band ply, and which is easy to process during manufacture. Consequently, an object of the invention is based on fashioning of the aforesaid belt in such a manner that with a band ply extending at right angles, therethrough, the influence of the band ply may be directed at certain points of the belt utilising simple technical means.

According to the present invention there is provided a pneumatic vehicle tyre having a radial carcase with a tension resistant belt extending substantially over the width of the tread strip region and being located between said carcase and said tread strip region whereby the belt consists of at least two superposed cord fabric plies forming a cross bracing and a ply band located thereabove made of filaments or the like extending parallel to one another and which filaments subtend very small angles with the circumferential direction of the tyre, in which, between the plies forming the cross bracing and the ply forming the band, a panel made of rubber or rubber-like materials is located in such a manner that, seen in the transverse direction of the belt, on the filaments or the like of the band in places are closely located to the plies of the cross bracing than in the remaining regions of the belt.

The intermediate ply formed of rubber or rubber-like material is thus so adapted that the filaments or the like of the cross bracing are located closest to the band in the edge region of the belt, more especially are located directly adjacent, which consequently leads to a triangular formation in the region of the belt edges in such a manner that the disadvantages created by the bevelled edges of the belt edges, more especially the movements of the filament ends are thereby eliminated, whilst in the region of the belt centre, the band on account of the ply located there, made of rubber or rubber-like materials has at most, a minimal effect.

The use of an intermediate ply in the aforesaid sense also permits an undulatory laying of the band, so that the latter, at more than two points, is located relatively close to the cross bracing, whereby a corresponding number of circumferential regions are created which are subject to the influence of the cross bracing, whilst in turn, in the regions located therebetween, the filaments or the like of the band have, at most, a minimal effect on the angular changes of the filaments or the like of the cross bracing, whereby better deformation of the belt is ensured.

The present invention will be further illustrated, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a radial part section through a pneumatic vehicle tyre in accordance with the present invention;

Fig. 2 is a partial plan view of the tread surface of the tyre of Fig. 1 showing its belt plies;

Fig. 3 is a schematic cross-sectional view of the belt for the tyre shown in Figs. 1 and 2, on an enlarged scale; and

Fig. 4 is a modified belt development corresponding to the view of Fig. 3.

The tyre body, formed substantially of rubber or rubber-like materials, has a carcase 1 of tension-resistant filaments 2 extending radially to the tyre, which filaments are anchored in the tyre bead region 4 by being looped around bead cores 3.

A tension-resistant belt 6 for stabilising the tyre body is located between the carcase 1 and the tread strip region 5 and extends substantially over the width of the tread strip region 5.

The belt 6, in its radially inner region, is formed by a cord fabric; for this purpose two superposed plies 7, 8, of rubberised steel wire fabric are provided. In each ply 7 and 8 the steel wires 9, having a diameter of about 0.8 to 1 mm, extend parallel to one another and subtend an angle of about 18 to 26° with reference to the circumferential direction of the tyre, in such a manner that the steel wires 9 of ply 7 extend in one diagonal direction and the steel wires 9 of ply 8 extend in the other diagonal direction relative to the circumferential direction of the tyre. The plies 7 and 8, including the rubberised portion have a wall thickness of about 1.5 mm.

A rubber panel 10 is located centrally and directly on ply 8. The width *b* of such panel 10 (Fig. 3) corresponds substantially to half the width B of the belt 6. Moreover, the panel 10 tapers into a point at its edges. It has a Shore hardness A of

about 45 to 70, preferably a hardness of 60 Shore, and a wall thickness corresponding substantially to the wall thickness of the plies 7 and 8; however, the wall thickness S of the rubber panel 10 may also amount to 0.7 to 2.5 times that of the plies 7 and 8.

Directly adjacent to the rubber panel 10, there is a band in the form of a rubberised ply 11, which consists of a plurality of tension-resistant filaments 12 located parallel to one another and which extend substantially in the circumferential direction of the tyre. The filaments 12 are made of polyamide or polyester or a similar plastics material which shrinks at the vulcanisation temperature, whereby the band is formed as the external belt ply.

The ply 11 is located in the belt centre and is spaced from the cross-bracing or the two plies 7 and 8 by the centrally located mesher panel 10. However, in the region of the edges, namely in an edge region comprising about 25% of the belt width, the ply 11 is located directly on the ply 8 so that herein a direct influence of the filaments 12 occurs and the possible movements at the free edges of the filaments 9 cannot occur in the edge region of the belt. In the centre of the belt, however, a balancing out occurs which, during deformation of the belt, permits angular changes of the filaments 9 to take place.

In the embodiment shown in Fig. 4, the rubber panel 10 has an undulatory surface 12, so that balancing out results in the regions A, B and C, the influence of the ply 11 on the other hand in the two edge regions and in the circumferential rows between the sections A, B and C, is more forcefully retained, whereby it is understood that by a suitable undulatory surface configuration of the panel 10, the required degree of balancing out may be effected.

They may, of course also be regions provided between the sections A, B and C in which the band 11 is completely omitted.

CLAIMS

1. A pneumatic vehicle tyre having a radial carcase with a tension resistant belt extending substantially over the width of the tread strip region and being located between said carcase and said tread strip region whereby the belt consists of at least two superposed cord fabric plies forming a cross bracing and a ply band located thereabove made of filaments or the like extending parallel to one another and which filaments subtend very small angles with the circumferential direction of the tyre, in which between the plies forming the cross bracing and the ply forming the band, a panel made of rubber or rubber-like materials is located in such a manner that, seen in the transverse direction of the belt, the filament or the like of the band in places are more closely located to the plies of the cross bracing than in the remaining regions of the belt.

2. A pneumatic vehicle tyre as claimed in claim 1, in which the ply of the band is directly adjacent, in the region of the belt edges, to the plies forming the cross bracing.

3. A pneumatic vehicle tyre as claimed in claim 1 or 2, in which the panel has acutely extending edges and, for this, has a wall thickness which is about from 0.7 to 2.5 times the diameter of the reinforcing members which form the cross bracing.

4. A pneumatic vehicle tyre as claimed in claim 3, in which the wall thickness is about 1.5 times the diameter of the reinforcing members.

5. A pneumatic vehicle tyre as claimed in any preceding claim, in which the panel is located centrally on the cross bracing and its width corresponds to half the width of the belt.

6. A pneumatic vehicle tyre as claimed in any preceding claim, in which the panel has a hardness of from about 55 to 70 Shore A.

7. A pneumatic vehicle tyre as claimed in claim 6, in which the hardness of the panel is about 60 Shore.

8. A pneumatic vehicle tyre as claimed in any preceding claim, in which all plies of the belt having reinforcing members are substantially of equal width.

9. A pneumatic vehicle tyre as claimed in any preceding claim, in which two or more panels are located spread over the width of the belt.

10. A pneumatic vehicle tyre as claimed in any preceding claim, in which the or each panel is provided which has an undulating surface by forming sections of varying wall thickness.

11. A pneumatic vehicle tyre substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1979
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.